jc498 U.S. PTO
12/21/98

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PATENT

Atty. Docket No. 678-206 (P8575)

jc551 U.S. PTO
09/217112
12/21/98

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Assistant Commissioner
for Patents
Washington, D.C. 20231

UTILITY APPLICATION FEE TRANSMITTAL

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): Kyou-Woong KIM

For: **METHOD FOR ISSUING A CALL TERMINATION ALERT ACCORDING TO SERVICE OPTIONS IN A COMPOSITE CELLULAR TERMINAL**

Enclosed are:

[X] 13 page(s) of specification

[X] 1 page(s) of Abstract

[X] 7 page(s) of claims

[X] 5 sheets of drawings [ ] formal [x] informal

[X] 2 page(s) of Declaration and Power of Attorney

[X] An Assignment of the invention to Samsung Electronics Co., Ltd.

CERTIFICATION UNDER 37 C.F.R. § 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date December 21, 1998 in an envelope as "Express Mail Post Office to Addressee" Mail Label Number EL164324934US addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.

Paul J. Farrell
(Type or print name of person mailing paper)

(Signature of person mailing paper)

[] This application claims the benefit under 35 U.S.C. §119(e) of U.S. Provisional Application(s) No(s).:

APPLICATION NO(S).:	FILING DATE
__/_____	_____
__/_____	_____

[ ] Certified copy of applications

Country	Appln. No.	Filed
Korea	70432/1997	12/19/97

from which priority under Title 35 United States Code, § 119 is claimed

[ ] is enclosed.

[x] will follow.

CALCULATION OF UTILITY APPLICATION FEE

For	Number Filed	Number Extra	Rate	Basic Fee $760.00
TOTAL CLAIMS	13	0	x 18 =	$0
INDEPENDENT CLAIMS	6	3	x 78 =	$234
[] Multiple Dep. Claim			+ 270	$0
			TOTAL $ 994.00	

[] Verified Statement of "Small Entity" Status Under 37 C.F.R. § 1.27. Reduced fees under 37 C.F.R. § 1.9(f) (50% of total) paid herewith $.

[X] The amount of $40.00 for recording the attached Assignment is enclosed as a separate check.

[X] Two checks in the amounts of $994.00 and $40.00 to cover the [X] recording, [X] filing fee(s) is attached.

[ ] Charge fee to Deposit Account No. 04-1121. Order No. _____
TWO (2) COPIES OF THIS SHEET ARE ENCLOSED.

[X] Please charge any deficiency as well as any other fee(s) which may become due under 37 C.F.R. § 1.16 and 1.17, at any time during the pendency of this application, or credit any overpayment of such fee(s) to Deposit Account No. 04-1121. Also, in the event any extensions of time for responding are required for the pending application(s), please treat this paper as a petition to extend the time as required and charge Deposit Account No. 04-1121 therefor. TWO (2) COPIES OF THIS SHEET ARE ENCLOSED.

Date: December 21, 1998

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*Includes all independent and single dependent claims and all claims referred to in multiple claims. See 37 C.F.R. § 1.75(c).

Please type a plus sign (+) inside this box → [+]

PTO/SB/05 (4/98)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.	678-206 (P8575)
First Inventor or Application Identifier	Kyou-Woong KIM
Title	Method for Issuing a Call...
Express Mail Label No.	EL164324934US

jc551 U.S. PTO 09/217112 12/21/98

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231

1. [X] * Fee Transmittal Form *(e.g., PTO/SB/17)* *(Submit an original and a duplicate for fee processing)*
2. [X] Specification [*Total Pages* 21] *(preferred arrangement set forth below)*
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
3. [X] Drawing(s) *(35 U.S.C. 113)* [*Total Sheets* 5]
4. Oath or Declaration [*Total Pages* 2]
   a. [X] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d)) *(for continuation/divisional with Box 16 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

** NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).*

5. [ ] Microfiche Computer Program *(Appendix)*
6. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Copy
   b. [ ] Paper Copy (identical to computer copy)
   c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. [X] Assignment Papers (cover sheet & document(s))
8. [ ] 37 C.F.R.§3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
9. [ ] English Translation Document *(if applicable)*
10. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
13. [ ] * Small Entity Statement(s) *(PTO/SB/09-12)* [ ] Statement filed in prior application, Status still proper and desired
14. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
15. [ ] Other: .....

16. If a **CONTINUING APPLICATION**, *check appropriate box, and supply the requisite information below and in a preliminary amendment:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No: ____/____

Prior application information: Examiner _____ *Group / Art Unit* _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

[ ] *Customer Number or Bar Code Label* *(Insert Customer No. or Attach bar code label here)* or [X] *Correspondence address below*

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Signature	Paul J. Farrell	*Date*	12/21/98

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PTO/SB/17 (2/98)
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FEE TRANSMITTAL

Patent fees are subject to annual revision on October 1.
These are the fees effective October 1, 1997.
Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12.
See 37 C.F.R. §§ 1 27 and 1.28.

TOTAL AMOUNT OF PAYMENT ($) 1,034

Complete if Known	
Application Number	
Filing Date	
First Named Inventor	Kyou-Woong KIM
Examiner Name	
Group / Art Unit	
Attorney Docket No.	678-206 (P8575)

METHOD OF PAYMENT (check one)

1. [X] The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

Deposit Account Number: 04-1121
Deposit Account Name:

[X] Charge Any Additional Fee Required Under 37 C.F.R. §§ 1.16 and 1.17
[ ] Charge the Issue Fee Set in 37 C F R. § 1.18 at the Mailing of the Notice of Allowance

2. [X] Payment Enclosed:
[X] Check [ ] Money Order [ ] Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
101	760	201	380	Utility filing fee	760
106	310	206	155	Design filing fee	
107	480	207	240	Plant filing fee	
108	760	208	380	Reissue filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) ($) 760

2. EXTRA CLAIM FEES

		Extra Claims		Fee from below	Fee Paid
Total Claims	13 -20** =	0	X	18	= 0
Independent Claims	6 - 3** =	3	X	78	= 234
Multiple Dependent					=

**or number previously paid, if greater; For Reissues, see below

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
103	18	203	9	Claims in excess of 20
102	78	202	39	Independent claims in excess of 3
104	260	204	130	Multiple dependent claim, if not paid
109	78	209	39	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 234

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	380	216	190	Extension for reply within second month	
117	870	217	435	Extension for reply within third month	
118	1,360	218	680	Extension for reply within fourth month	
128	1,850	228	925	Extension for reply within fifth month	
119	300	219	150	Notice of Appeal	
120	300	220	150	Filing a brief in support of an appeal	
121	260	221	130	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,210	241	605	Petition to revive - unintentional	
142	1,210	242	605	Utility issue fee (or reissue)	
143	430	243	215	Design issue fee	
144	580	244	290	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	40
146	760	246	380	Filing a submission after final rejection (37 CFR 1.129(a))	
149	760	249	380	For each additional invention to be examined (37 CFR 1.129(b))	

Other fee (specify) _____
Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 40

SUBMITTED BY				Complete (if applicable)	
Typed or Printed Name	Paul J. Farrell, Esq.			Reg. Number	33,494
Signature	Paul J. Farrell	Date	12/21/98	Deposit Account User ID	04-1121

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METHOD FOR ISSUING A CALL TERMINATION ALERT ACCORDING TO SERVICE OPTIONS IN A COMPOSITE CELLULAR TERMINAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to composite cellular terminals, and more particularly, it relates to a method for issuing a call termination alert in a composite cellular terminal.

2. Description of the Related Art

With the progress of mobile communication technology, a cellular mobile communication terminal can provide data service as well as existing voice service. A cellular terminal which can provide a data service, such as a facsimile service, a short message service (SMS) and an internet service as well as a voice service, is referred to as a composite cellular terminal.

Existing cellular communication terminals, designed to provide only voice services, cannot provide data service features including call termination alert tones and call termination display messages. In addition, although personal information terminals such as the PDA (Personal Digital Assistant) do provide various data services, the same call termination alert tone is generated irrespective of the type of data service provided. This is undesirable in that the user may not audibly perceive the type of data service being originated from a base station.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide methods and an apparatus for generating different call termination alert tones according to service options in a composite cellular terminal.

It is another object of the present invention to provide methods and an apparatus for displaying different call termination display messages according to service options in a composite cellular terminal.

To achieve the above objects, there is provided methods and an apparatus for issuing different call termination alert tones and different call termination display messages according to the types of terminated calls in a composite cellular terminal providing various service options. In accordance with the method, the mobile cellular terminal sets and stores a unique call termination alert tone and call termination display message for each service option provided by the terminal. Upon receipt of a paging message, the mobile cellular terminal recognizes a service option contained within the message, and retrieves a call termination alert tone corresponding to the recognized service option, and generates the corresponding tone in response. Further, the mobile terminal retrieves and displays a call termination display message corresponding to the recognized service option. Recognized service options preferably include; a voice call service, an asynchronous data service, a facsimile service, a short message service, a packet data service and a CDPD service.

Call termination alert tones are set (i.e. initialized) as follows: upon receipt of

a call termination alert tone setting key input from a user, the terminal, in response, will display a list of service options. The user will then select one of the listed service options via a key input. Next, the terminal displays a list of call termination alert tones. The user will then select one of the listed alert tones via a key input. Thereafter, the terminal associates the selected call termination alert tone to the selected service option and generates the selected call termination alert tone. Upon receiptof a confirmation key input from the user, the terminal then stores the selected call termination alert tone in association with the selected service option.

Call termination display messages are set (i.e. initialized) as follows: upon receipt of a call termination display message setting key input from a user, the terminal, in response, will display a list of service options. The user will then select one of the listed service options via a key input. Next, the terminal displays a prompt requesting a user to input a call termination display message. The terminal displays thecall termination display message input by the user. Upon receipt of a confirmation key input from the user, the terminal stores the input call termination display message in association with the selected service option.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a block diagram of a composite cellular terminal in accordance with the present invention.

FIG. 2 is a flowchart illustrating the steps for setting different call termination alert tones in accordance with the provided service options;

FIG. 3 is a flowchart illustrating the steps for setting different call termination display messages in accordance with the provided service options;

FIG. 4 is a flowchart illustrating a procedure for issuing different call termination alert tones and different call termination display messages according to the service options.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

A preferred embodiment of the present invention will be described hereinbelow with reference to the accompanying drawings. In the following description, well known functions or constructions are not described in detail so as not to obscure the invention in unnecessary detail.

FIG. 1 is a block diagram of a composite cellular terminal in accordance with the present invention. As illustrated, the composite cellular terminal is divided into a mobile telephone section 100 and a PDA section 200.

Referring now to the mobile telephone section 100, a first CPU (Central Processing Unit) 111 controls the overall operations and performs data communication with the PDA section 200. A program memory 112, preferrably a flash memory, stores a program for controlling the overall operations of the mobile telephone section. A data memory 113, preferably a RAM (Random Access Memory), temporarily stores data generated during operation of the mobile telephone section. A nonvolatile memory 114, preferably an EEPROM (Electrically Erasable and Programmable Read Only Memory), stores phone numbers for speed dialing and system parameters. A keypad 115 generates key commands for controlling operation of the first CPU 111 and key data for inputting data. A display 116, preferably an LCD (Liquid Crystal Display), displays status information generated during operation of the mobile telephone section, under the control of the first CPU 111. In particular, the display 116 displays different call termination display messages according to the types of the terminated calls. A buzzer 117 generates different call termination alert tones according to the types of the terminated calls, under the control of the first CPU 111.

A communication block 121 of the mobile telephone section 100 is composed of an RF (Radio Frequency) part 122, a frequency conversion (shifting) part 118, a modulation/demodulation part 119 and a signal processing part 120. The communication block is controlled by the first CPU 111. Though not depicted, the signal processing part 120 includes an interleaver, an encoder, a deinterleaver, a decoder, a vocoder and a PCM (Pulse Code Modulation) codec. In addition, detailed control signal lines of the first CPU 111, a voice signal processing circuit, a speaker and a microphone are omitted in FIG. 1, for clarity.

In a transmission mode, signal processing part 120 of communication block 121 encodes the transmission data. The modulation/demodulation part 119 modulates the coded transmission data, and the frequency conversion part 118 up-converts the modulated transmission signal to an RF transmission signal. Finally, the RF part 117 bandpass filters the RF transmission signal at a transmission frequency band, and amplifies the bandpass filtered signal and radiates it through an antenna.

In a reception mode, the RF part 122 low-noise amplifies a low power signal received through the antenna and bandpass filters the amplified signal at a reception frequency band. Then, the frequency conversion part 118 down-converts the received RF signal to a base band signal, the modulation/demodulation part 119 demodulates the base band signal, and the signal processing part 120 decodes the demodulated signal into the original signal.

Referring now to the PDA section 200, a second CPU 211 controls the overall operations of the PDA section 200 and performs data communication with the first CPU 111 of the mobile telephone section 100. A program memory 212, preferably a flash memory, stores a program for controlling the PDA section. A data memory 213, a RAM, temporarily stores data generated during operation of the PDA section 200, under the control of the second CPU 211. A nonvolatile memory 214, preferably an EEPROM, stores information to be registered in the PDA section and information input during data communication with the mobile telephone section 100. A keypad 215 generates key commands for controlling operation of the second CPU 211 and key data for inputting data. A display 216, an LCD, displays status information generated during operation of the PDA section, under the control of the second CPU 211. A

communication block 217, a UART (Universal Asynchronous Receiver Transmitter), forms a data communication path to an external device.

In the composite cellular terminal, the mobile telephone section 100 may, for example, be a CDMA (Code Division Multiple Access) telephone and the PDA section 200 may, for example, be a hand PC (Personal Computer).

As illustrated in FIG. 1, the first CPU 111 of the mobile telephone section 100 communicates with the second CPU 211 of the PDA section 200 asynchronously at a preferable data rate of 57.6Kbps by way of a UART 150. Here, an HDLC (High-level Data Link Control) message format is used. The UART 150 is an asynchronous receiver/transmitter available for both serial-to-parallel data conversion and parallel-to-serial data conversion. Through the UART 150, the PDA section may graphically process the user interface data input from the mobile telephone section.

The present invention is directed to generating different call termination alert tones and/or displaying different call termination display messages according to service options provided to the composite cellular terminal. By way of example, Table 1 illustrates CDMA service options specified by TIA/EIA TSB-58.

TABLE 1

Service Option No.	Service Type
1	Voice Call Service
4	Asynchronous Data Service

5	G3 FAX Service
6	Short Message Service
7	Packet Data Service (Internet)
8	CDPD Service

*where CDPD stands for Cellular Digital Packet Data

In a preferred embodiment, the call termination alert tones and the call termination display messages according to the service options are set by the manufacturer and then stored in the program memory 112.

Now, reference will be made to a method of setting the different call termination alert tones in accordance with the service options with reference to FIGS. 1 and 2. It is to be appreciated that the following steps may be performed either by an end user or as a manufacturing step.

FIG. 2 is a flowchart illustrating the steps for setting different call termination alert tones in accordance with the provided service options. In step 221, the first CPU 111 checks whether a call termination alert tone setting key input is received from the keypad 115. If a call termination alert tone setting key input is received, the process continues at step 223, otherwise, the process continues to a normal modeat step 239. Upon receipt of a call termination alert tone setting key input, the first CPU 111 displays, in step 223, the service options (See Table 1) on the display 116.

Upon viewing the various service options on the display, the user will choose

one of the listed service options by inputting an associated service option number. The first CPU 111 then selects the service option corresponding to the user's key input, in step 225. Next, in step 227, the first CPU 111 displays a list of call termination alert tones together with an associated index on the display 116. The user will then choose one of the listed call termination alert tones by inputting an associated call termination alert tone number. In step 229, the first CPU 111 then selects the chosen call termination alert tone according to the user's key input. Thereafter, the first CPU 111 matches the selected call termination alert tone to the selected service option in step 231, and generates the selected call termination alert tone through the buzzer 117 in confirmation of the selected call termination alert tone, in step 233. Then, in step 235, the first CPU 111 checks whether the user has input a confirmation key. If a confirmation key input is received, the first CPU 111 proceeds to step 237 and stores the selected call termination alert tone in the non-volatile memory 114 in association with the selected service option. If, a confirmation key input is not received, the first CPU 111 otherwise returns to step 227 and re-displays the list of call termination alert tones.

Now, reference will be made to a method of setting the different call termination display messages according to the service options with reference to FIGS. 1 and 3. It is to be appreciated that the following steps may be performed either by an end user or as a manufacturing step.

FIG. 3 is a flowchart illustrating the steps for setting call termination display messages in accordance with the various service options. At step 311, the first CPU 111 checks whether a display message setting key input is received from the keypad

115. If the display message setting key input is received, the process continues at step 313, otherwise, the process continues in a normal mode at step 325. In step 313, upon receipt of the display message setting key input, the first CPU 111 displays a list of service options (See Table 1) on the display 116.

Upon viewing the displayed service options, the user, via a key input, will choose one of the listed service options by inputting an associated service option number. The first CPU 111 then selects the service option chosen by the user in accordance with the user's key input, in step 315. The first CPU 111 then displays on the display 116 a message requesting the user to input an appropriate call termination display message, in step 317. Then, the user inputs a brief display message expressing the corresponding service option. As the user inputs the display message, the first CPU 111 displays the message on the display 116, in step 319. After displaying the call termination display message, the first CPU 111 checks, in step 321, whether the user has input a conformation key. If the confirmation key input is received, the first CPU 111 stores the call termination display message in the non-volatile memory 114 in association with the selected service option, in step 323. However, if a confirmation key input is not received, the first CPU 111 returns to step 319 and continues to display the display message input by the user.

Table 2 illustrates, by way of example, call termination alert tones and call termination display messages, which are set in accordance with the procedures of FIGs. 2 and 3. The table illustrates that, in general, not all service options will be made available to each composite cellular terminal. This is illustrated in the present example whereby service options 2 and 3 are not available.

TABLE 2

Service Option No.	Call Termination Alert Tone No.	Display Message
1	4	Voice Call
4	6	Circuit Call
5	2	FAX Call
6	1	SMS Call
7	5	Packet Call
8	3	CDPD Call

Reference will now be made to a control procedure for issuing different call termination alert tones and/or different call termination display messages according to the service options, with reference to FIGs. 1, 4A and 4B.

Referring to FIGs. 1, 4A and 4B, at step 411, the first CPU 111 checks whether a paging message is received from the base station through the antenna. When a paging message is received, the process continues to step 413, otherwise, the process continues to a normal mode at step 435. At step 413, upon receipt of a paging message, the first CPU 111 analyzes the received paging message to extract a telephone number and a serial number of the composite cellular terminal from the received paging message. At step 415, the first CPU 111 determines whether the extracted telephone number and serial number are identical to those stored in the terminals non-volatile memory 114, so as to determine whether the received paging message is directed to the composite cellular terminal. When the extracted telephone number and serial number are identical

to those stored in the non-volatile memory 114, the process continues to step 417, otherwise, the process continues to the normal mode at step 435. In step 417, the first CPU 111 stores the service option number recognized from the paging message in the data memory 113. Thereafter, the first CPU 111 checks, in step 419, whether the composite cellular terminal can provide the recognized service option or not, through negotiation with the base station. Here, if it is possible to provide the recognized service option, the process continues to step 421, otherwise, the process continues at step 435 to perform the normal mode. In step 421, the first CPU 111 checks whether an alert message is received from the base station. If an alert message is received from the base station, the process continues to step 423, otherwise, the process continues to check whether an alert message has been received. In step 423, the first CPU 111 reads the service option number stored in the data memory 113, and then issues the call termination alert tone and the call termination display message corresponding to the read service option number in the succeeding steps.

Specifically, after reading the service option number, the first CPU 111 reads the call termination alert tone number corresponding to the service option number from the program memory 112, in step 425. Subsequently, in step 427, the first CPU 111 reads the call termination alert tone corresponding to the call termination alert tone number from the non-volatile memory 114 and generates the read call termination alert tone through the buzzer 117. Thereafter, in step 429, the first CPU 111 reads the call termination display message corresponding to the service option number from the program memory 112 and displays the read display message on the display 116. Then, at the sound of the call termination alert tone, the user will check the service option through the display 116 and input a specific key to transmit/receive data according to

the service option. The first CPU 111 then checks in step 431 whether the specific key for the data transmission/reception is input or not. Here, if the specific key is input, the first CPU 111 goes to step 433 to transmit/receive the data, and otherwise, continues to check whether the specific key is input or not.

Although the composite cellular terminal transmits the data in response to the specific key input by the user in this embodiment, it can be understood that it can automatically transmit the data in answer to the call termination.

As described above, upon reception of a call incoming from the base station, the composite cellular terminal of the invention generates different call termination alert tones according to the service options, so that the user may easily perceive the type of the terminated call by ear. In addition, the composite cellular terminal displays different call termination display messages according to the service options, so that the user may easily perceive the type of the terminated call visually.

While the invention has been shown and described with reference to a certain preferred embodiment thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. A method for generating a unique call termination alert tone responsive to a terminated call in a composite cellular terminal providing one or more service options, the method comprising the steps of:

setting and storing said unique call termination alert tone for each of said one or more service options;

recognizing a service option from a received paging message;

retrieving a call termination alert tone corresponding to the recognized service option; and

generating the retrieved call termination alert tone.

2. The method as claimed in claim 1, wherein said service options comprise a voice call service, an asynchronous data service, a facsimile service, a short message service, a packet data service and a CDPD (Cellular Digital Packet Data) service.

3. A method for displaying a unique call termination display message responsive to a terminated call in a composite cellular terminal providing one or more service options, the method comprising the steps of:

setting and storing said unique call termination display messages for each of

said one or more service options;

determining whether the received paging message is for the composite cellular terminal;

recognizing a service option from the received paging message when the received paging message is for the composite cellular terminal;

retrieving a call termination display message corresponding to the recognized service option; and

displaying the call termination display message.

4. The method as claimed in claim 3, wherein said service options comprise a voice call service, an asynchronous data service, a facsimile service, a short message service, a packet data service and a CDPD service.

5. A method for issuing a unique call termination alert tone and a unique call termination display message according to types of terminated calls in a composite cellular terminal providing one or more service options, the method comprising the steps of:

setting and storing a unique call termination alert tone for each of said provided one or more service options;

setting and storing a unique call termination display message for each of said provided one or more service options;

recognizing a service option from a received paging message;

retrieving a call termination alert tone corresponding to the recognized service option;

generating the retrieved call termination alert tone;

retrieving a call termination display message corresponding to the recognized service option; and

displaying the call termination display message.

6. The method as claimed in claim 5, wherein said step of setting and storing a unique call termination alert tone for each of said provided service options further comprises the steps of:

displaying a list of said one or more service options upon reception of a call termination alert tone setting key input;

selecting one of the displayed one or more service options in response to a user's key input;

displaying a list of call termination alert tones;

selecting one of the displayed call termination alert tones in response to a user's key input;

matching the selected call termination alert tone to the selected service option; generating the selected call termination alert tone; and

storing the selected call termination alert tone in association with the selected service option upon reception of a confirmation key input.

7. The method as claimed in claim 5, wherein said step of setting the call termination display messages comprises the steps of:

displaying said one or more service options upon reception of a call termination;

selecting one of the service options in response to a user's key input;

displaying a message requesting a user to input a call termination display message;

displaying a call termination display message input by the user; and

storing the input call termination display message in association with the selected service option upon reception of a confirmation key.

8. The method as claimed in claim 5, wherein said service options comprise a voice call service, an asynchronous data service, a facsimile service, a short message service, a packet data service and a CDPD service.

9. A composite cellular terminal for generating a unique call termination alert tone responsive to a received paging message having a recognized service option, the composite cellular terminal comprising:

means for setting and storing said unique call termination alert tone for each of said one or more service options;

means for recognizing a service option from a received paging message;

means for retrieving a call termination alert tone corresponding to the recognized service option; and

means for generating the retrieved call termination alert tone.

10. A composite cellular terminal for generating a unique call termination display message responsive to a received paging message having a recognized service option, the composite cellular terminal comprising:

means for setting and storing said unique call termination display messages for each of said one or more service options;

means for determining whether the received paging message is for the composite cellular terminal;

means for recognizing a service option from the received paging message when the received paging message is for the composite cellular terminal;

means for retrieving a call termination display message corresponding to the recognized service option; and

means for displaying the call termination display message.

11. A composite cellular terminal for generating a unique call termination display message responsive to a received paging message having a recognized service option, the composite cellular terminal comprising:

a first CPU for controlling the overall operation of a mobile telephone section, and for performing data communication with a personal digital assistant (PDA) section;

a program memory, operatively coupled to the first CPU for storing one or more programs;

a data memory, operatively coupled to the first CPU for storing data generated during operation of the mobile telephone section;

a non-volatile memory, operatively coupled to the first CPU for storing phone numbers, system parameters, and for speed dialing; and

a communication block for performing data communications with a base terminal.

12. The apparatus of claim 11, wherein the communication block further comprises:

an RF frequency module for bandpass filtering the RF transmission signal at a transmission frequency band, and for amplifying a transmission signal for radiation through an antenna;

a frequency conversion module for up/down conversion of transmission data;

a modulation/demodulation module for modulating the coded transmission data; and

a signal processing module for encoding transmission data.

13. The apparatus of claim 11, wherein the personal digital assistant section (PDA) section further comprises:

a second CPU for controlling the overall operations of the PDA section;

a program memory for storing one or more programs;

a data memory for storing data generated during operation of the PDA section; and

a non-volatile memory for storing information to be registered in the PDA section, and information input during data communication with the mobile telephone section.

ABSTRACT OF THE DISCLOSURE

A composite cellular terminal providing various service options issues different call termination alert tones and different call termination display messages according to types of terminated calls. The cellular terminal sets and stores the call termination alert tones and the call termination display messages according to those service options which are available for the composite cellular terminal. Upon reception of a paging message, If the terminal recognizes the service option contained within the paging message, the terminal then retreives a call termination alert tone corresponding to the recognized service option and generates the call termination alert tone. The terminal then retreives a call termination display message corresponding to the recognized service option and displays the read call termination display message. Service options may include a voice call service, an asynchronous data service, a facsimile service, a short message service, a packet data service and a CDPD (Cellular Digital Packet Data) service.

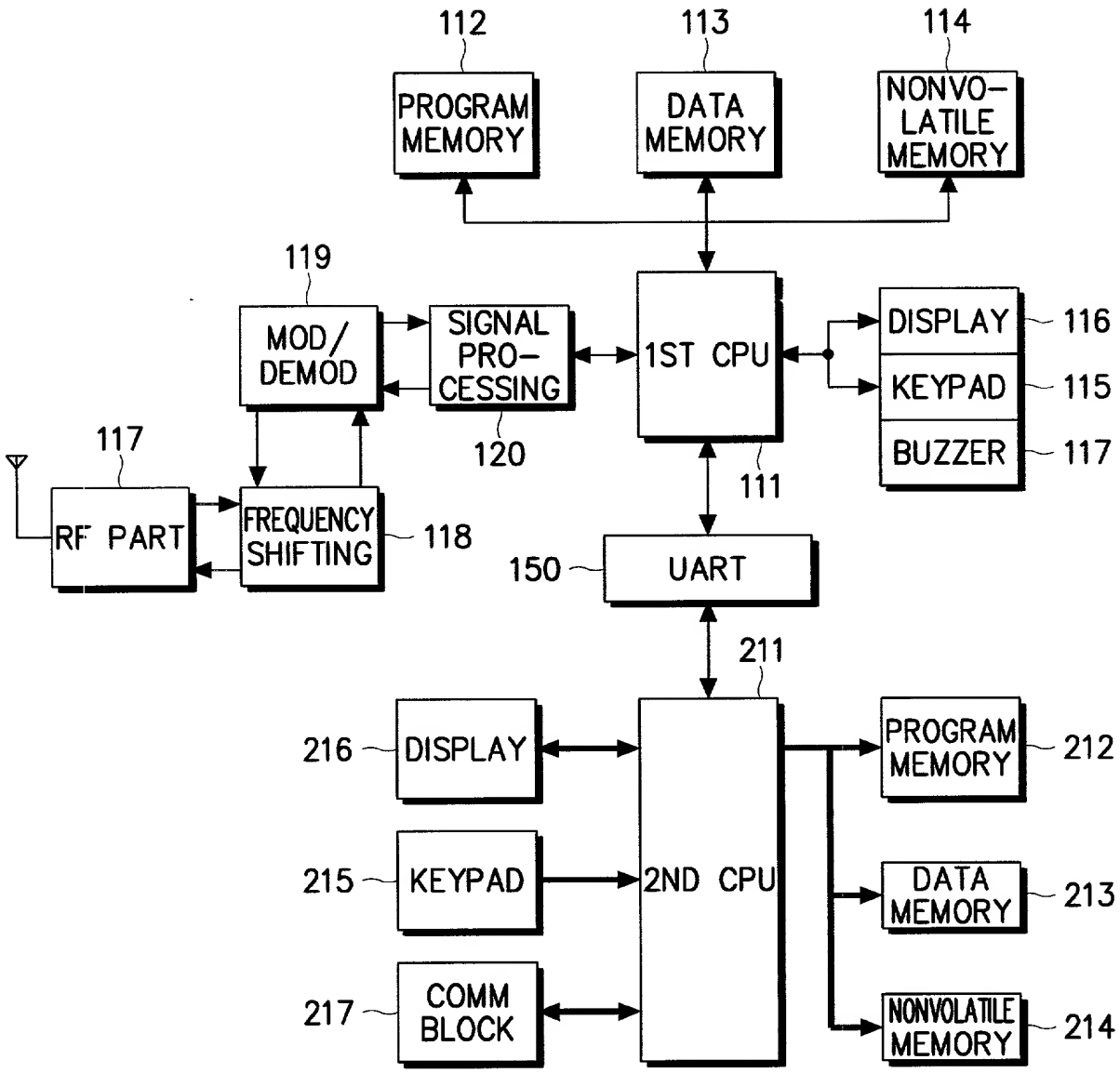
112
PROGRAM MEMORY
113
DATA MEMORY
114
NONVO-LATILE MEMORY
119
MOD/ DEMOD
SIGNAL PRO-CESSING
120
1ST CPU
DISPLAY
116
KEYPAD
115
BUZZER
117
111
117
RF PART
FREQUENCY SHIFTING
118
150
UART
211
216
DISPLAY
2ND CPU
PROGRAM MEMORY
212
215
KEYPAD
DATA MEMORY
213
217
COMM BLOCK
NONVOLATILE MEMORY
214

FIG. 1

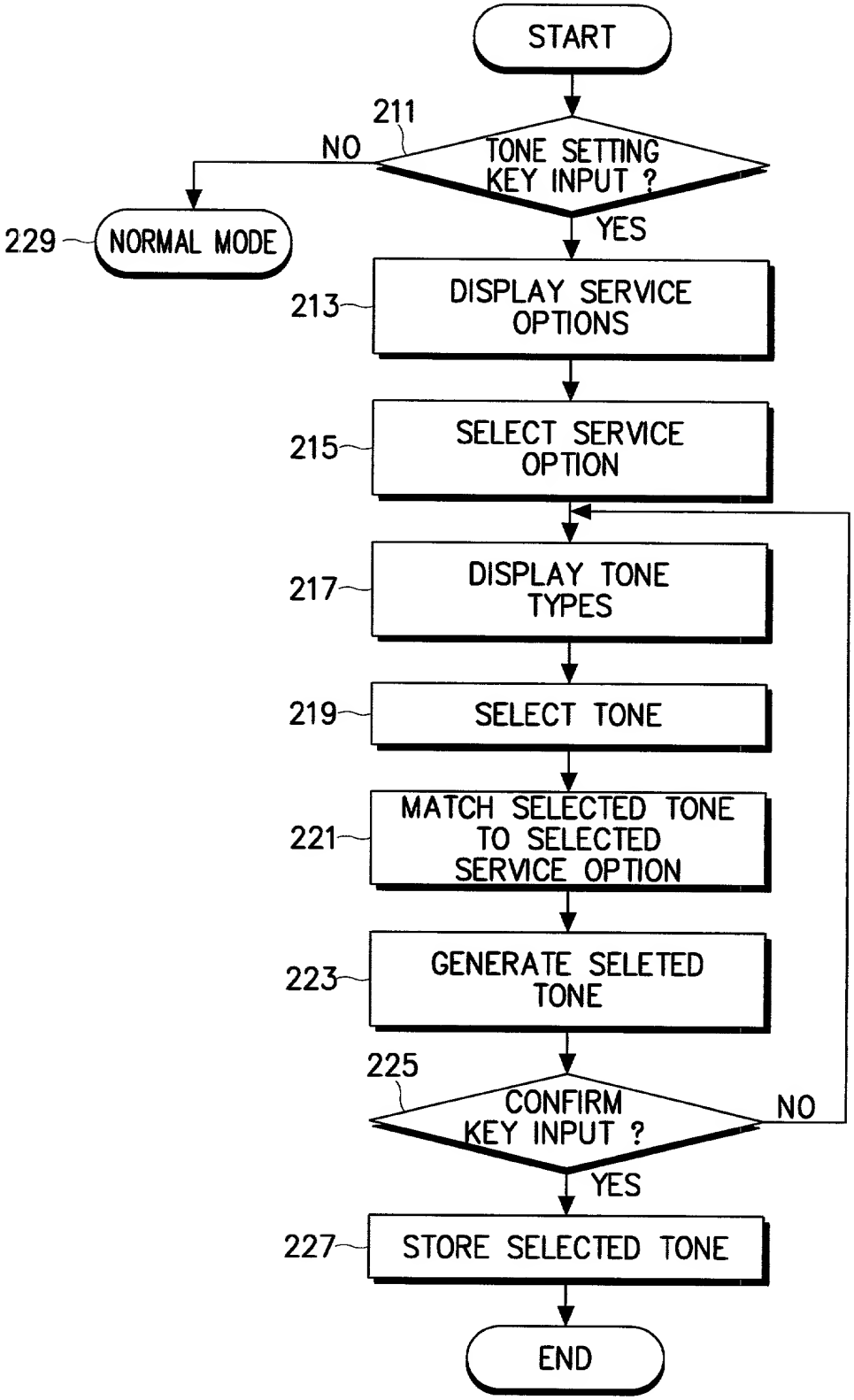
START
211
TONE SETTING KEY INPUT ?
NO
YES
229
NORMAL MODE
213
DISPLAY SERVICE OPTIONS
215
SELECT SERVICE OPTION
217
DISPLAY TONE TYPES
219
SELECT TONE
221
MATCH SELECTED TONE TO SELECTED SERVICE OPTION
223
GENERATE SELETED TONE
225
CONFIRM KEY INPUT ?
NO
YES
227
STORE SELECTED TONE
END

FIG. 2

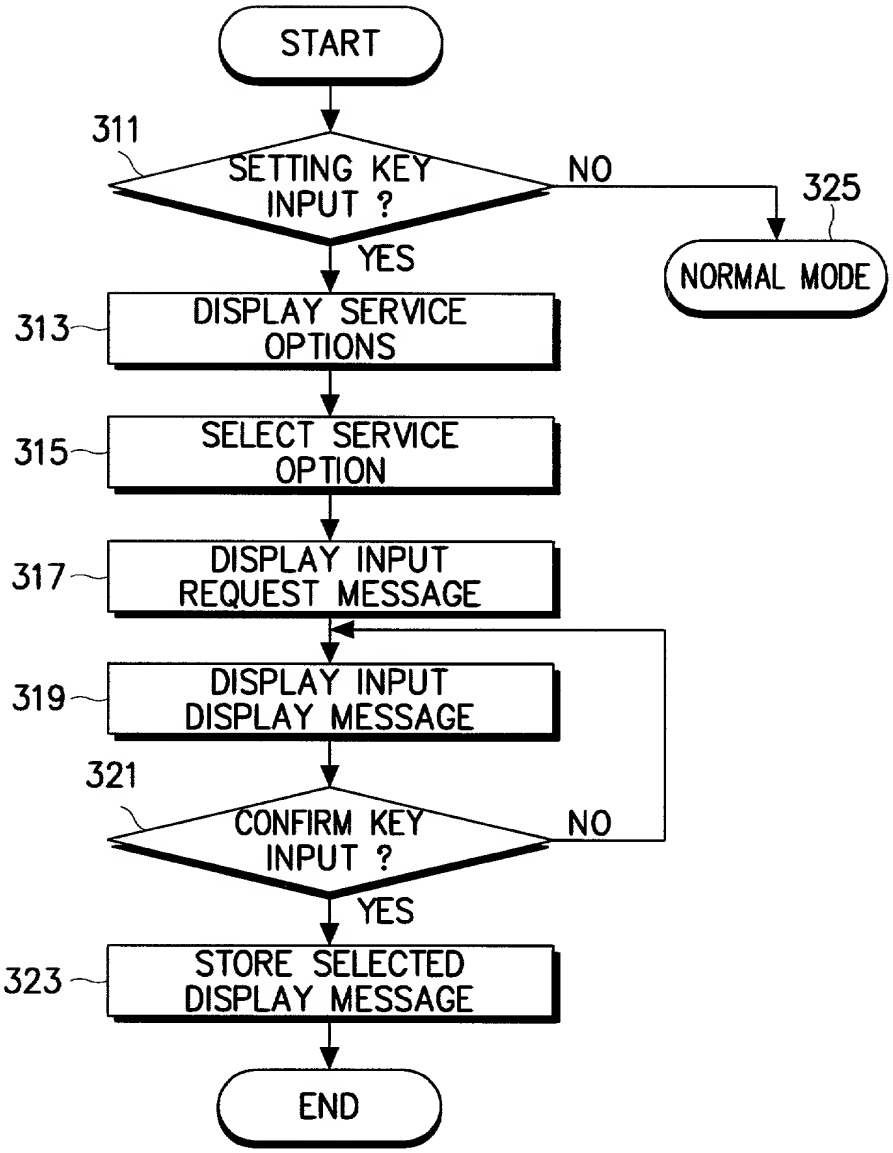
START
311
SETTING KEY INPUT ?
NO
325
NORMAL MODE
YES
313
DISPLAY SERVICE OPTIONS
315
SELECT SERVICE OPTION
317
DISPLAY INPUT REQUEST MESSAGE
319
DISPLAY INPUT DISPLAY MESSAGE
321
CONFIRM KEY INPUT ?
NO
YES
323
STORE SELECTED DISPLAY MESSAGE
END

FIG. 3

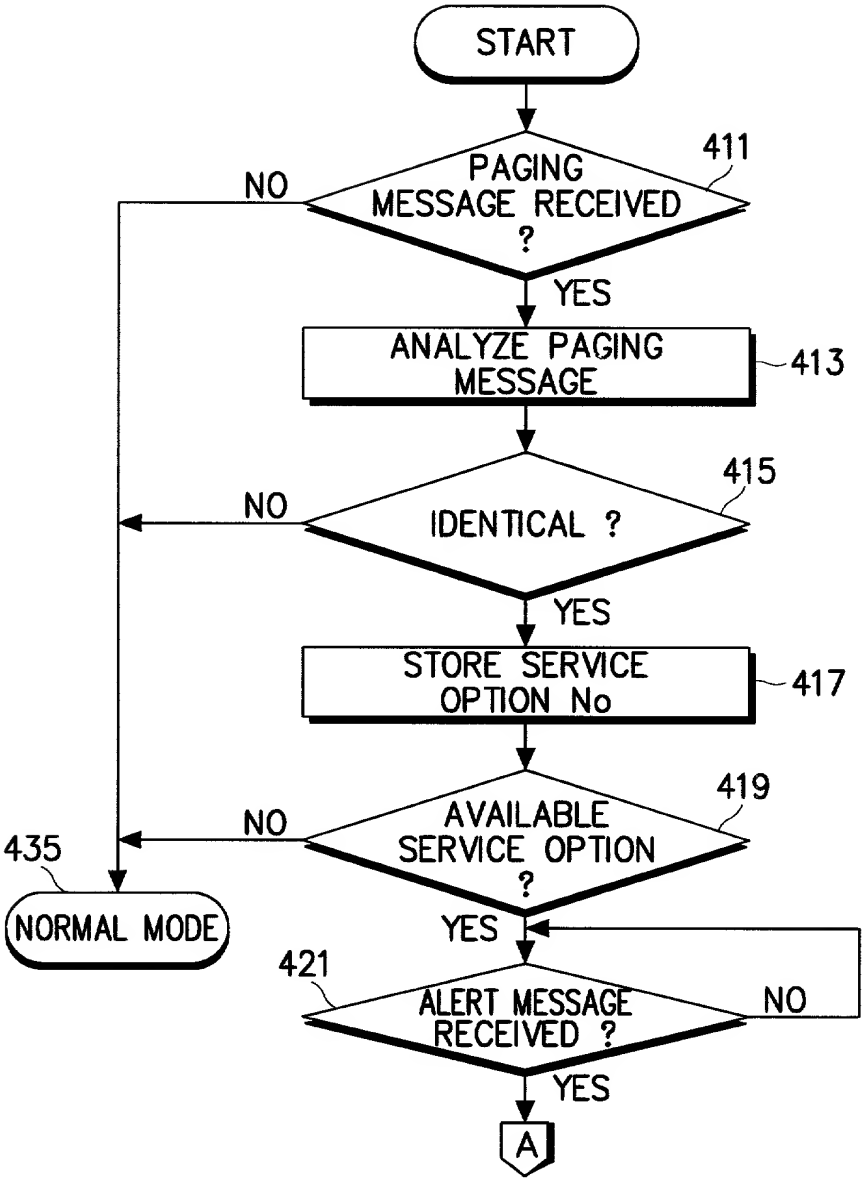
START
411
PAGING MESSAGE RECEIVED ?
NO
YES
ANALYZE PAGING MESSAGE
413
415
IDENTICAL ?
NO
YES
STORE SERVICE OPTION No
417
419
AVAILABLE SERVICE OPTION ?
NO
435
NORMAL MODE
YES
421
ALERT MESSAGE RECEIVED ?
NO
YES
A

FIG. 4A

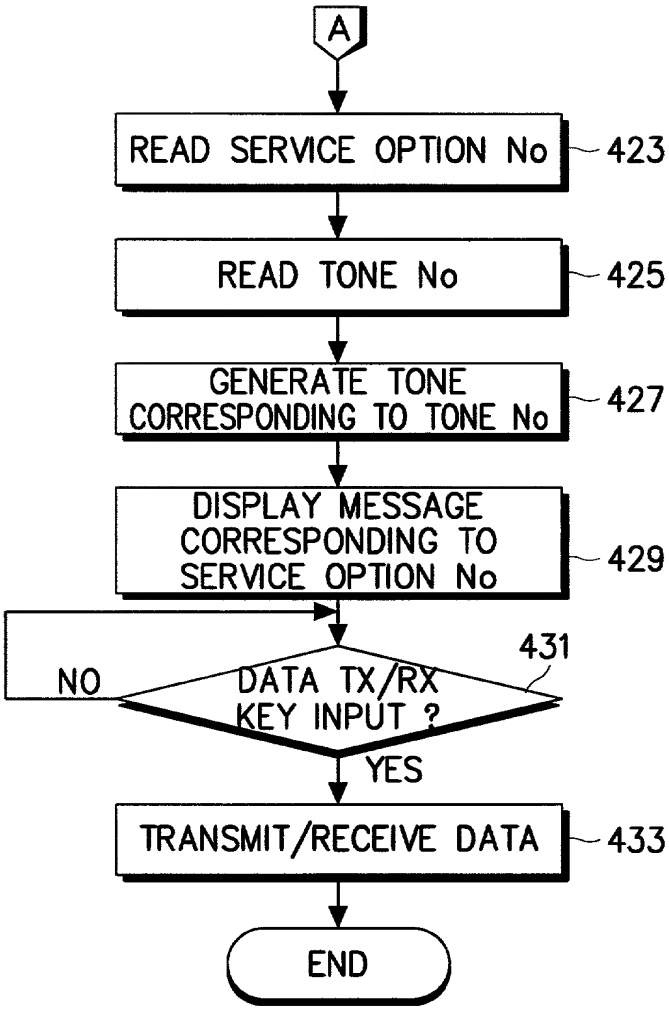
A
READ SERVICE OPTION No
423
READ TONE No
425
GENERATE TONE CORRESPONDING TO TONE No
427
DISPLAY MESSAGE CORRESPONDING TO SERVICE OPTION No
429
431
NO
DATA TX/RX KEY INPUT ?
YES
TRANSMIT/RECEIVE DATA
433
END

FIG. 4B

PTO/SB/01 (6/95)

DECLARATION

Attorney Docket No._____

AS A BELOW NAMED INVENTOR, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe that I am the original, first and sole *(if only one name is listed below)*, or an original, first and joint inventor *(if plural names are listed below)*, of the subject matter which is claimed and for which a patent is sought on the invention entitled: METHOD FOR ISSUING A CALL TERMINATION ALERT ACCORDING TO SERVICE *TITLE:* OPTIONS IN A COMPOSITE CELLULAR TERMINAL

the specification of which either is attached hereto or indicates an attorney docket no. _____, or:

☐ was filed in the U.S. Patent & Trademark Office on _____ and assigned Serial No. _____,

☐ and *(if applicable)* was amended on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability and to the examination of this application in accordance with Title 37 of the Code of Federal Regulations §1.56. I hereby claim foreign priority benefits under Title 35, U.S. Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States or §119(e) of any United States provisional application(s), listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

			Priority Claimed
70432/1997	Korea	12/19/97	Yes [X] No [ ]
(Application Number)	*(Country)*	*(Day/Month/Year filed)*	
			Yes [ ] No [ ]
(Application Number)	*(Country)*	*(Day/Month/Year filed)*	

I hereby claim the benefit under Title 35, U.S. Code, §120, of any United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of Title 35, U.S. Code, §112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, The Code of Federal Regulations, §1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial Number)	*(Filing Date)*	*(STATUS: patented, pending, abandoned)*
(Application Serial Number)	*(Filing Date)*	*(STATUS: patented, pending, abandoned)*

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I HEREBY DECLARE that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 U.S. Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's signature: Kim, Kyon Woong Date: December, 21, 1998
Residence & Post Office Address: 674-9, Yoksam 2-dong, Kangnam-gu, Seoul, Korea

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Inventor's signature: _____ Date: _____
Residence & Post Office Address:

FULL NAME OF THIRD JOINT INVENTOR: _____ Citizenship _____

Inventor's signature: _____ Date: _____
Residence & Post Office Address:

FULL NAME OF FOURTH JOINT INVENTOR: _____ Citizenship _____

Inventor's signature: _____ Date: _____
Residence & Post Office Address:

FULL NAME OF FIFTH JOINT INVENTOR: _____ Citizenship _____

Inventor's signature: _____ Date: _____
Residence & Post Office Address:

FULL NAME OF SIXTH JOINT INVENTOR: _____ Citizenship _____

Inventor's signature: _____ Date: _____
Residence & Post Office Address: